

JAPAN

EDICT OF GOVERNMENT

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JIS C 9335-2-7 (2004) (English): Household and similar electrical appliances -- Safety -- Part 2-7: Particular requirements for washing machine

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*The citizens of a nation must
honor the laws of the land.*

Fukuzawa Yukichi

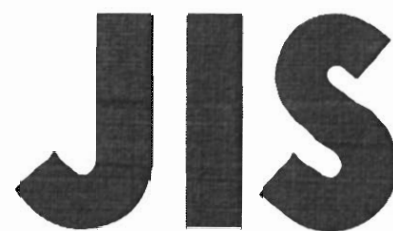
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JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
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JIS C 9335-2-7 : 2004
(JEMA)

**Household and similar electrical
appliances—Safety—
Part 2-7 : Particular requirements
for washing machine**

ICS 13.120; 97.060

Reference number : JIS C 9335-2-7 : 2004 (E)

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Electrical Manufacturer's Association (JEMA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS C 9335-2-7 : 1999** is replaced with this Standard.

This revision has been made based on **IEC 60335-2-7 : 2002** *Household and similar electrical appliances—Safety—Part 2-7 : Particular requirements for washing machine* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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Household and similar electrical appliances—Safety—Part 2-7 : Particular requirements for washing machine

Introduction This Japanese Industrial Standard has been prepared based on IEC 60335-2-7 *Household and similar electrical appliances—Safety—Part 2-7 : Particular requirements for washing machine* published in 2002 as the sixth edition with some modifications in the technical contents. This is to be read in conjunction with JIS C 9335-1 : 2003 *Household and similar electrical appliances—Safety—Part 1 : General requirements*.

In this Standard, the portions underlined with dots are the matters modified from the original International Standard. The list of modifications is given in annex 1 (informative) with the explanation being attached.

1 Scope This Standard deals with the safety of electric washing machines for household and similar use, that are intended for washing clothes and textiles, their rated voltage being not more than 250 V for single-phase appliances and 480 V for other appliances.

NOTE 101 Washing machines also supplied with other forms of energy are within the scope of this Standard.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms, are within the scope of this Standard.

NOTE 102 Examples of such appliances are washing machines for communal use in blocks of flats or in launderettes.

As far as is practicable, this Standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

NOTE 103 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

NOTE 104 This Standard does not apply to

- appliances intended exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

NOTE 105 The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent according to **ISO/IEC Guide 21**).

IEC 60335-2-7 : 2002 *Household and similar electrical appliances—Safety—Part 2-7 : Particular requirements for washing machine (MOD)*

2 Normative references Normative references shall be as stated in clause 2 of **JIS C 9335-1** except as follows.

Addition:

JIS C 9811 *Electric cloths washing machines for household use—Methods for measuring the performance*

ISO 1817 : 1999 *Rubber, vulcanized—Determination of the effect of liquids*

3 Definitions The principal definitions for this Standard shall be as stated in clause 3 of **JIS C 9335-1** except as follows.

3.1.9 Replacement:

normal operation operation of the appliance under the following conditions

The appliance is filled with textile material having a mass in the dry condition equal to the maximum mass stated in the instructions, and with the maximum quantity of water for which it is constructed. However, if the power input or current is higher when only 50 % of the textile material is used, the appliance is operated with this load instead.

The temperature of the water is

— $65\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for appliances without heating elements;

However, appliances intended for washing by cool water may be tested by using water at ordinary temperature.

— $15\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for other appliances.

If the appliance does not incorporate a programmer, the water is heated to $90\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ or as high as the construction will allow if lower, before starting the first washing period.

The textile material consists of pre-washed double-hemmed cotton sheets having dimensions approximately $70\text{ cm} \times 70\text{ cm}$ and a specific mass between 140 g/m^2 and 175 g/m^2 in the dry condition.

NOTE 101 In washing machines of the continuously rotating impeller type, if the textile material does not move properly during operation, its quantity is reduced until the maximum power input of the motor is attained.

NOTE 201 Textile material with a size of approximately $91\text{ cm} \times 91\text{ cm}$ and a specific mass of $100\text{ g/m}^2 \pm 10\text{ g/m}^2$ in dry condition, specified in **JIS C 9811**, may be used.

4 General requirement General requirement shall be as stated in clause 4 of JIS C 9335-1.

5 General conditions for the tests General conditions for the tests shall be as stated in clause 5 of JIS C 9335-1 except as follows.

5.3 Addition to 5.3 of JIS C 9335-1:

The test of 15.101 is carried out before the test of 15.3.

5.7 Addition to 5.7 of JIS C 9335-1:

NOTE 101 Doubt is considered to exist if the temperature of the water is within 6 K of the boiling point and the difference between the temperature rise of the relevant part and the limit specified does not exceed 25 K minus the room temperature.

6 Classification Classification shall be as stated in clause 6 of JIS C 9335-1 except as follows.

6.1 Modification:

Appliances shall be of class 0I, class I, class II or class III relating with protection against electric shock.

Compliance is checked visually and by associated tests.

6.2 Addition to 6.2 of JIS C 9335-1.

Appliances shall be at least IPX4.

7 Marking and instructions Marking and instructions shall be as stated in clause 7 of JIS C 9335-1 except as follows.


7.1 Addition to 7.1 of JIS C 9335-1:

Appliances without automatic water level control shall be marked with the maximum water level.

The safety release mechanism of power-driven wringers shall be marked to indicate its method of operation, unless its operating means has to be continuously actuated by the user.

NOTE 101 This marking may be near the mechanism.

7.6 Addition to 7.6 of JIS C 9335-1:

 [symbol 5036 of IEC 60417-1] dangerous voltage

7.10 Addition 7.10 of JIS C 9335-1:

If the off position is only indicated by letters, the word "off" or the Japanese Kanji character denoting "off" shall be used.

7.12 Addition to 7.12 of JIS C 9335-1:

The instructions shall specify the maximum mass of dry cloth in kilograms to be used in the appliance.

The instructions for washing machines incorporating a power-driven wringer shall draw attention to the potential hazards involved when operating the wringer and shall state that

- the wringer must be disengaged or switched off when not in use;
- the appliance must not be operated by children.

If symbol 5036 of **IEC 60417-1** is used, its meaning shall be explained.

7.12.1 Addition to 7.12.1 of JIS C 9335-1:

The installation instructions shall state

- that the appliance is to be connected to the water mains using new hose-sets and that old hose-sets should not be reused;

NOTE 101 This instruction is not required if the hoses are permanently attached to the appliance.

- the maximum permissible inlet water pressure, in megapascals, for appliances intended to be connected to the water mains;
- the minimum permissible inlet water pressure, in megapascals, if this is necessary for the correct operation of the appliance;
- for washing machines with ventilation openings in the base, that a carpet must not obstruct the openings.

7.14 Addition to 7.14 of JIS C 9335-1:

The height of symbol 5036 of **IEC 60417-1** shall be at least 5 mm.

Compliance is checked by measurement.

7.101 The enclosure of magnetic valves, and similar components incorporated in external hoses for direct connection to the water mains, shall be marked with symbol 5036 of **IEC 60417** if their working voltage exceeds extra-low voltage.

NOTE: This symbol is a warning sign and the rules of **ISO 3864** apply.

Compliance is checked by inspection.

8 Protection against access to live parts Protection against access to live parts shall be as stated in clause 8 of **JIS C 9335-1** except as follows.

8.1.1 Addition to 8.1.1 of JIS C 9335-1:

NOTE 201 Stationary washing machine which exceeds 40 kg when the maximum designed water is filled shall be subjected to the test without tilt.

9 Starting of motor-operated appliances Clause 9 of **JIS C 9335-1** is not applicable.

10 Power input and current Power input and current shall be as stated in clause 10 of **JIS C 9335-1** except as follows.

10.1 Addition to 10.1 of JIS C 9335-1:

NOTE 101 The selected representative period is the period during which the power input is the highest.

10.2 Addition to 10.2 of JIS C 9335-1:

NOTE 101 The selected representative period is the period during which the current is the highest.

11 Heating Heating shall be as stated in clause 11 of JIS C 9335-1 except as follows.

11.7 Replacement of 11.7 of JIS C 9335-1:

Appliances incorporating a programmer are operated for three cycles with the programme that results in highest temperature rises, with a rest period of 4 min between cycles.

Other appliances are operated for three cycles, with a rest period of 4 min between cycles. Each cycle consists of the following operations:

- | | |
|---|--|
| — for appliances without means for water extraction, | washing; |
| — for appliances having a single drum for washing and water extraction, | washing followed by water extraction; |
| — for appliances having separate drums for washing and water extraction that cannot be used simultaneously, | washing and water extraction separated by an additional 4 min rest period; |
| — for appliances having separate drums for washing and water extraction that can be used simultaneously, | washing together with water extraction so that the operations terminate simultaneously; |
| — for appliances incorporating a power-driven wringer, | washing followed by wringing; |
| — for appliances having a single drum for washing, water extraction and drying | |
| • that allow the same quantity of textile material to be washed and dried in the drum, | washing followed by water extraction, followed by drying; |
| • that, according to the instructions, only allow a portion of the washed textile material to be dried in the drum, | washing followed by water extraction followed by two drying periods, with an additional rest period of 4 min before each drying period. In this case only two cycles of operation are carried out. |

For appliances incorporating a timer, the washing period, the water extraction period and the drying period are equal to the maximum period allowed by the timer.

For appliances without a timer,

- the washing period has a duration of
 - 6 min, for washing machines of the continuously rotating impeller type,
 - 18 min, for washing machines of the agitator type,
 - 25 min for washing machines of the drum type, unless a longer period is stated in the instructions;
- the water extraction period has a duration of 5 min.

For power-driven wringers, the duration of each wringing period is 8 min. The wringer is loaded by passing a board through the rollers once a minute, the roller pressure being adjusted to the maximum value. The board is approximately 20 mm thick and 80 cm long, its width being at least equal to three-quarters of the effective length of the rollers. The board is uniformly tapered at each end down to a thickness of approximately 3 mm, over a distance of 20 cm.

The rest period, including any braking time, has a duration of 4 min.

After the specified sequence of operation, discharge pumps that are driven by a separate motor and switched on and off manually, are subjected to three operating periods separated by rest periods of 4 min. Each operating period is equal to 1.5 times the period necessary to empty the appliance when filled to the maximum normal water level. The outlet of the water discharge pipe is 90 cm above the floor.

NOTE 101 Washing machines with a hand-operated wringer are tested as appliances without means for water extraction.

12 Void

13 Leakage current and electric strength at operating temperature Leakage current and electric strength at operating temperature shall be as stated in clause 13 of JIS C 9335-1 except as follows.

13.2 Modification of 13.2 of JIS C 9335-1:

For stationary class I appliances, the leakage current shall not exceed 3.5 mA, or 1 mA/kW of rated power input with a limit of 5 mA, whichever is greater.

14 Transient overvoltages Transient overvoltages shall be as stated in clause 14 of JIS C 9335-1.

15 Moisture resistance Moisture resistance shall be as stated in clause 15 of JIS C 9335-1 except as follows.

15.1 Addition to 15.1 of JIS C 9335-1:

Magnetic valves and similar components incorporated in external hoses for connection to the water mains are subjected to the test specified for IPX7 appliances.

15.2 Replacement:

Appliances shall be constructed so that spillage of liquid in normal use does not affect their electrical insulation even if an inlet valve fails to close.

Compliance is checked by the following test.

Appliances with type X attachment, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cord of the smallest cross-sectional area specified in table 13.

Appliances intended to be filled with water by the user are completely filled with water containing approximately 1 % NaCl. A further quantity of this solution equal to 15 % of the capacity of the appliance or 0.25 L, whichever is greater, is poured in steadily over a period of 1 min.

Other appliances are operated until the maximum water level is reached, and 5 g or the amount specified in the instruction for detergent of the detergent specified in annex AA is added for each litre of water in the appliance. The inlet valve is held open and the filling continued for 15 min after first evidence of overflow or until the inflow is automatically stopped by other means.

For appliances that are loaded from the front, the door is then opened if this can be achieved manually and without damage to the door interlock system.

For appliances having a working surface, 0.5 L of water containing approximately 1 % NaCl and 0.6 % of rinsing agent, as specified in annex AA, is poured over the top of the appliance, the controls being placed in the on position. The controls are then operated through their working range, this operation being repeated after a period of 5 min.

The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduced of clearances and creepage distances below the values specified in clause 29.

15.101 Appliances shall be constructed so that foaming does not affect electrical insulation.

Compliance is checked by the following test that is carried out immediately after that of 15.2.

The appliance is operated under the conditions specified in clause 11 but for one complete cycle with the programme that results in the longest period of operation. Twice the quantity of detergent necessary for normal washing is added, the composition of which is specified in annex AA.

For appliances incorporating a detergent dispenser, the solution is added manually at the point in the cycle when it would normally be dispensed automatically. For other appliances with solution is added before starting the cycle.

The appliance shall then withstand the electric strength test of 16.3.

The appliance is kept in a test room having a normal atmosphere for 24 h before being subjected to the test of 15.3.

16 Leakage current and electric strength Leakage current and electric strength shall be as stated in clause 16 of JIS C 9335-1.

17 Overload protection of transformers and associated circuits Overload protection of transformers and associated circuits shall be as stated in clause 17 of JIS C 9335-1.

18 Endurance Clause 18 of JIS C 9335-1 is not applicable.

19 Abnormal operation Abnormal operation shall be as stated in clause 19 of JIS C 9335-1 except as follows.

19.1 Addition to 19.1 of JIS C 9335-1:

For appliances incorporating a programmer or a timer, the tests of 19.2 and 19.3 are replaced by the test of 19.101.

The test of 19.7 is not carried out on motors driving moving parts of an oscillating agitator.

19.2 Addition to 19.2 of JIS C 9335-1:

Restricted heat dissipation is obtained without water in the appliance or with just sufficient water to cover the heating elements, whichever is the more unfavourable.

19.7 Addition to 19.7 of JIS C 9335-1:

Appliances without a programmer or timer are operated for 5 min.

Moving parts of a wringer are locked even if a trip bar prevents rotation of the rollers.

19.9 Subclause 19.9 of JIS C 9335-1 is not applicable.

19.13 Addition to 19.13 of JIS C 9335-1:

The textile material shall not ignite and shall not show any charring or glowing.

NOTE 101 Light brown colouring of the textile material or slight emission of smoke is ignored.

During the tests of 19.101, the temperature of windings shall not exceed the values specified in table 8.

19.101 The appliance is supplied at rated voltage and operated under normal operation. Any fault condition or unexpected operation that may be applied in normal use is introduced.

NOTE 1 Examples of fault conditions and unexpected operations are:

- the programmer stopping in any position;
- disconnection and reconnection of one or more phases of the supply during any part of the programme;
- open-circuiting or short-circuiting of components;
- failure of a magnetic valve;
- failure or blocking of the mechanical part of a water-level switch;
- puncture of the capillary tube of a thermostat.

NOTE 2 Locking the main contacts of a contactor, used for energizing heating elements, in the "on" position is considered to be a fault condition, unless at least two independent sets of contacts are provided. This may be achieved by two contactors operating independently of each other or by one contactor having two independent armatures operating two independent sets of contacts.

NOTE 3 In general, tests are limited to the fault conditions that may be expected to give the most unfavourable results.

The simulation of component faults is limited to those that could expose the user to a hazard.

NOTE 4 If operation without water in the appliance is a more unfavourable condition for starting any programme, the tests with that programme are carried out with the water valve closed. This valve is not closed after the programme has started to operate.

NOTE 5 If the appliance stops at any particular point in the programme, the test with that fault condition is considered to be ended.

NOTE 6 The fault condition with

- the automatic filling device held open is covered by 15.2;
- thermal controls short-circuited is covered by 19.4;
- motor capacitors short-circuited or open-circuited is covered by 19.7.

20 Stability and mechanical hazards Stability and mechanical hazards shall be as stated in clause 20 of JIS C 9335-1 except as follows.

20.1 Modification of 20.1 of JIS C 9335-1:

The appliance is empty or filled as specified for normal operation, whichever is more unfavourable. Doors and lids are closed and any castors turned to the most unfavourable position.

20.101 Washing machines of the drum type that are loaded from the top through an opening with a hinged lid shall incorporate an interlock that de-energizes the motor before the lid opening exceeds 50 mm.

If a removable or sliding lid is provided, the motor shall be de-energized as soon as the lid is removed or displaced and it shall not be possible to start the motor unless the lid is in the closed position.

The interlock shall be constructed so that unexpected operation of the appliance is unlikely unless the lid is in the closed position.

Compliance is checked by inspection, by measurement and by manual test.

NOTE: Interlocks that can be released by means of test probe B of JIS C 0922 are not considered to comply with this requirement.

20.102 Washing machines of the drum type that are loaded from the front, shall incorporate an interlock that de-energizes the motor before the door opening exceeds 50 mm.

The interlock shall be constructed so that unexpected operation of the appliance is unlikely unless the lid is in the closed position.

NOTE 1 Interlocks that can be released by means of test probe B of JIS C 0922 are not considered to comply with this requirement.

When the water level in the appliance is above the lower edge of the door opening, it shall not be possible to open the door by a simple action while the appliance is operating.

NOTE 2 Interlocked doors and doors that are opened by means of a key, or by two separate actions such as pushing and turning, are considered to comply with this requirement.

Compliance is checked by inspection, by measurement and by manual test.

20.103 Power-driven wringers shall be constructed so that the pressure between the rollers has to be maintained by the user, unless a readily accessible safety release or other means of protection is incorporated.

The release mechanism shall operate easily without violent ejection of any part and shall release pressure on the rollers immediately. The rollers shall separate either by at least 45 mm at both ends or by at least 25 mm at one end and 75 mm at the other.

The safety release shall be operable by a person standing in any normal working position relative to the wringer, even if the fingers of both hands are trapped between the rollers.

Power-driven wringers shall be constructed to prevent fingers being squeezed between a roller and the frame.

Power-driven wringers shall be controlled by an easily accessible switch.

NOTE : The switch controlling the washing machine may also control the wringer.

Compliance is checked by inspection, by measurement, by manual test and by the following test.

The pressure between the rollers is adjusted to its maximum value. The board described in 11.7 is passed between the rollers and the wringer is stopped when the board is approximately halfway through. A force is gradually applied to the operating means of the safety release. The release shall operate before the force exceeds 70 N.

21 Mechanical strength Mechanical strength shall be as stated in clause 21 of JIS C 9335-1.

22 Construction Construction shall be as stated in clause 22 of JIS C 9335-1 except as follows.

22.6 Modification of 22.6 of JIS C 9335-1:

Instead of coloured water, a solution composed of 5 g or the amount described in the instruction for detergent of the detergent specified in annex AA per litre of distilled water is used.

NOTE 101 Parts that withstand the ageing test specified in annex BB are not considered to be parts where leakage could occur.

22.101 Appliances shall withstand the water pressure expected in normal use.

Compliance is checked by connecting the appliance to a water supply having a static pressure equal to twice the maximum permissible inlet water pressure or 1.2 MPa, whichever is higher, for a period of 5 min.

There shall be no leakage from any part, including the inlet water hose.

22.102 Appliances shall be constructed so that textile material cannot come into contact with heating elements.

Compliance is checked by inspection.

22.103 Appliances shall be constructed so that during normal use filter compartments cannot be opened by a simple action if this results in an outflow of water having a temperature exceeding 50 °C.

NOTE 1 Interlocked covers, and covers that are opened by means of a key or by two separate actions such as pushing and turning, are considered to comply with this requirement.

NOTE 2 Rotation by more than 180° is not considered to be a simple action.

Compliance is checked by inspection and by manual test. If the filter compartment can be opened, any flow of water shall not exceed 0.5 l/min.

23 Internal wiring Internal wiring shall be as stated in clause 23 of JIS C 9335-1 except as follows.

23.101 The insulation and sheath of internal wiring for the supply of magnetic valves and similar components incorporated in external hoses for connection to the water mains shall be at least equivalent to light polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 52 specified in JIS C 3662-5).

Compliance is checked by inspection.

NOTE: The mechanical characteristics specified in JIS C 3662 series are not checked.

24 Components Components shall be as stated in clause 24 of JIS C 9335-1 except as follows.

24.1.4 Addition to 24.1.4 of JIS C 9335-1:

The number of cycles of operation for programmers is 3 000.

24.101 Thermal cut-outs incorporated in washing machines for compliance with 19.4 shall not be self-resetting.

Compliance is checked by inspection.

25 Supply connection and external flexible cords Supply connection and external flexible cords shall be as stated in clause 25 of JIS C 9335-1.

26 Terminals for external conductors Terminals for external conductors shall be as stated in clause 26 of JIS C 9335-1.

27 Provision for earthing Provision for earthing shall be as stated in clause 27 of JIS C 9335-1.

28 Screws and connections Screws and connections shall be as stated in clause **28** of **JIS C 9335-1**.

29 Clearances, creepage distances and solid insulation Clearances, creepage distances and solid insulation shall be as stated in clause **29** of **JIS C 9335-1** except as follows.

29.2 Addition to **29.2** of **JIS C 9335-1**:

The microenvironment is pollution degree 3, and the insulation shall have a CTI not less than 250, unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance due to

- condensation produced by the appliance;
- chemicals, such as detergent or fabric conditioner.

30 Resistance to heat and fire Resistance to heat and fire shall be as stated in clause **30** of **JIS C 9335-1** except as follows.

30.2 Addition to **30.2** of **JIS C 9335-1**:

For appliances incorporating a programmer or a timer, **30.2.3** is applicable. For other appliances, **30.2.2** is applicable.

31 Resistance to rusting Resistance to rusting shall be as stated in clause **31** of **JIS C 9335-1**.

32 Radiation, toxicity and similar hazards Radiation, toxicity and similar hazards shall be as stated in clause **32** of **JIS C 9335-1**.

Annexes

The annexes A to O and annex 1 of **JIS C 9335-1** are applicable except as follows.

Annex AA (normative)

Detergent and rinsing agent

AA.1 Detergent The composition of the detergent is as follows:

Substance	Parts by mass %
Linear sodium alkyl benzene sulphonate (mean length of alkane chain $C_{11.5}$)	6.4
Ethoxylated tallow alcohol (14 EO)	2.3
Sodium soap (chain length $C_{12 \text{ to } 16}$: 13 % to 26 % and $C_{18 \text{ to } 22}$: 74 % to 87 %)	2.8
Sodium tripolyphosphate	35.0
Sodium silicate (SiO_2 : 76.75 % and Na_2O : 23.25 %)	6.0
Magnesium silicate	1.5
Carboxy methyl cellulose	1.0
Ethylenediamine tetra-acetic-sodium-salt	0.2
Optical whitener for cotton (dimorpholinostibene type)	0.2
Sodium sulphate (as accompanying substance or added)	16.8
Water	7.8
Sodium perborate tetrahydrate (supplied separately)	20.0

NOTE 1 The detergent specified in the instructions may be used, but if there is any doubt with regards to the test results, this composition is to be used.

NOTE 2 The composition of the detergent is extracted from **IEC 60456**.

AA.2 Rinsing agent The composition of the rinsing agent is as follows:

Substance	Parts by mass %
Plurafac LF 221 ¹⁾	15.0
Cumenu sulfonate (40 % solution)	11.5
Citric acid (anhydrous)	3.0
Deionized water	70.5

The rinsing agent has the following properties:

- viscosity, 17 mPas;
- pH, 2.2 (1 % in water).

NOTE 1 Any commercially available rinsing agent may be used, but if there is any doubt with regards to the test results, this composition is to be used.

NOTE 2 The composition of the rinsing agent is extracted from **IEC 60436**.

1) Plurafac LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of the International Standard and does not constitute an endorsement by **IEC** and **JIS** of this product.

Annex BB (normative)
Ageing test for elastomeric parts

The ageing test on elastomeric parts is carried out by measuring their hardness and mass before and after immersion in a solution of detergent at elevated temperature.

The test is carried out on at least three samples of each part. The samples and test procedure are as specified in **ISO 1817**, with the following modifications.

4 Test liquids The liquid is obtained by dissolving 5 g of the detergent specified in annex AA per litre of distilled water.

NOTE : Care is to be taken to ensure that the total mass of the test pieces immersed does not exceed 100 g for each litre of solution, that the test pieces are completely immersed and that their entire surface is freely exposed to the solution. During the tests, the test pieces are not to be exposed to direct light. Test pieces of different compounds are not to be immersed at the same time in the same solution.

5 Test pieces

5.4 Conditioning of test pieces The temperature is $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and the relative humidity is $(50 \pm 5)\%$.

6 Immersion in the test liquid

6.1 Temperature The solution is heated within 1 h with the test pieces immersed, to a temperature of $75^{+5}_0\text{ }^{\circ}\text{C}$ and maintained at this value. The solution is renewed every 24 h and heated in the same way.

NOTE : To avoid undue evaporation of the solution, it is recommended to use a closed-circuit system or similar method for renewing the solution.

6.2 Duration The test pieces are immersed for a total period of 48^{+1}_0 h .

The test pieces are then immediately immersed in a fresh solution, which is maintained at ambient temperature. The pieces are immersed for $45\text{ min} \pm 15\text{ min}$.

After having been removed from the solution, the test pieces are rinsed in cold water at $15\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and then dried with blotting paper.

7 Procedure

7.2 Change in mass The increase in mass of the test pieces shall not exceed 10 % of the value determined before immersion.

7.6 Change in hardness The micro-test for hardness applies.

The hardness of the test pieces shall not have changed by more than 8 IRHD. Their surface shall not have become sticky and shall show no crack visible to the naked eye or any other deterioration.

Annex 1 (informative)

Comparison table between JIS and corresponding International Standard

JIS C 9335-2-7 : 2004 Household and similar electrical appliances—Safety— Part 2-7: Particular requirements for washing machine				IEC 60335-2-7 : 2002 Household and similar electrical appliances— Safety—Part 2-7: Particular requirements for washing machine			
(I) Requirements in JIS		(II) Inter- national Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classifi- cation by clause	Detail of technical deviation	
1 Scope	Safety of electric wash- ing machines for house- hold and similar use, their rated voltage being not more than 250 V for single-phase appliances and 480 V for other appliances	IEC 60335-2-7	1	Identical with JIS.	IDT	—	
2 Normative references	Normative references for the text ISO 1817, JIS C 9811	IEC 60335-2-7	2	ISO Standard is cited. IEC 60436	MOD/ addition	JIS C 9811 is added.	Because the specification of JIS C 9811 is cited in 3.1.9 as a devia- tion.

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
3 Definitions	<p>Definition of normal operation The temperature of water is — $65^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for appliances without heating elements: However, appliances intended for washing by cool water may be tested by using water at ordinary temperature. — $15^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for other appliances Testing textile material Cotton sheets with a size of approximately $70\text{ cm} \times 70\text{ cm}$ and a specific mass between 140 g/m^2 and 175 g/m^2 in dry condition Cloth sheets with a size of $91\text{ cm} \times 91\text{ cm}$ and a specific mass between 90 g/m^2 and 110 g/m^2 specified in the performance test (of JIS C 9811) are used as the load for the test of impeller type washing machines.</p>	IEC 60335-2-7	3	<p>Definition of normal operation The temperature of water is — $65^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for appliances without heating elements — $15^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for other appliances Testing textile material Cotton sheets with a size of approximately $70\text{ cm} \times 70\text{ cm}$ and a specific mass between 140 g/m^2 and 175 g/m^2 in dry condition</p>	MOD/ addition	<p>(1) Temperature of water for washing machine intended to use cool water is added. (2) Textile material specified in JIS C 9811 is also applicable.</p>	<p>(1) In Japan, there is no custom to carry out washing at a higher temperature of 65°C (this is submitted to IEC). (2) If the textile material specified in IEC is used, there is such possibility that the performances determined in the performance standard are not sufficiently satisfied when the textile material corresponding to the maximum capacity is used (since indication of capacity in the performance standard is different from that in the safety standard). Therefore JIS permitted use of the same textile material as that specified in the performance standard. The textile material specified in JIS C 9811 simulates the standard washing in Japanese living better. (This is submitted to IEC.)</p>

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Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
4 General requirement	General rule for safety	IEC 60335-2-7	4	Identical with JIS.	IDT	—	
5 General conditions for the tests	Test sequence, test temperature, etc.	IEC 60335-2-7	5	Identical with JIS.	IDT	—	
6 Classification	6.1 As regards classification according to protection against electric shock, at least class 0I is required. 6.2 At least IPX4 is required.	IEC 60335-2-7	6	6.1 As regards classification according to protection against electric shock, at least class I is required. 6.2 Identical with JIS.	MOD/ addition	JIS approved class 0I appliances.	Approval of class 0I appliances is based on circumstances of Japanese power distribution system (no earthing in a plug socket).
7 Marking and instructions	Instruction for marking of "off" position, maximum washing capacity etc. and precautional marking for washing machines directly connected to water mains.	IEC 60335-2-7	7	Identical with JIS. If the OFF position is only indicated by letters, the word "off" shall be used.	MOD/ addition	JIS had added the Japanese Kanji character denoting "off" alternating just "off".	Authorized Japanese indication.

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Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
8 Protection against access to live parts	Inspection by test finger and test pin	IEC 60335-2-7	8	Identical with JIS. However, the inspection is carried out also on the bottom face while the specimen is being tilted for appliances not more than 40 kg in mass.	IDT	In JIS, a stationary washing machine is not tilted if its mass exceeds 40 kg under such condition that the designed maximum capacity of water is filled in the washing tank.	Stationary washing machines in which water is stored in the tank are not tilted in their normal operation, otherwise the water spills out. Normally their hose is connected to water mains and their tilting is difficult to consider. To follow IEC specification, there are two following structural countermeasures. (1) To apply double insulation to the wirings and electrical components (class II construction) (2) To close the opening in the bottom of machine body. But in both cases problems may arise (especially in full automatic washing machines). 1) Problems when countermeasure (1) is executed In the case of full automatic washing machine, wirings (bundled) which extend from the water tank to the enclosure (frame) are necessary, and this internal wirings across the said parts are loosened to cope with the movement of water tank during operation and required to have adequate flexibility to withstand vibration during operation. Even if a flexible tube is used for the said part as the additional insulation, the tube will flex without following the loosening of internal wirings and so-called "buckling" state will appear.

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Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
8 Protection against access to live parts (continued)							<p>This "buckling" occurs, without relation with tube flexibility, due to such reason that the diameter of tube is larger than that of internal wirings (bundle of plural lead wires) (because the lead wire bundle is not capable of being passed through the tube if the diameter of tube is not larger than the thickness of lead wire bundle).</p> <p>If the vibration during operation is applied to the internal wirings under such condition, it is possible that the internal wirings are broken because bending of internal wirings is concentrated at the "buckling" part of tube.</p> <p>2) Problems when countermeasure (2) is executed</p> <p>In a full automatic washing machine, the water tank is suspended, and fixed to the machine body at its upper and lower parts by means of packaging material to withstand the vibration and accidental falling down during transportation.</p>

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
8 Protection against access to live parts (continued)							<p>Therefore the bottom of present full automatic washing machine is opened so as to fix the tank on the packaging material. If the opening on the bottom of machine body is closed, it is necessary to fix the water tank by bolts or the like, so that it becomes necessary for the installer to remove the fixing components at installation by tilting the machine (in the present packaging structure, fixing of water tank is released only by such work that the package is opened and the machine body is removed from the packaging).</p> <p>When the machine is installed by the dealer, there is no problem, because he has the knowledge relating with the installation, but when the installation is done by a general consumer such a case is easily assumed that removing of fixing components is forgotten and the machine is put into operation.</p> <p>Even if removal of fixing components before operation of machine is described in the installation instruction, it is not ensured that a general consumer reads and follows the instruction. Furthermore possibility of installation by a general consumer is higher for machines not exceeding 40 kg stated in this clause, especially for small machines.</p>

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
8 Protection against access to live parts (concluded)							If the machine is operated while removal of fixing components is forgotten, abnormal vibration appears especially during extraction and it is possible that the machine turns over and causes injury of user or damage of peripheral household belongings. Therefore, the safety level stated in Clause 1 of Ministerial Order based on Electrical Appliance and Material Safety Law is adopted in JIS , for the time of being. Such problems will be further discussed sufficiently, proposal of alternative to IEC being in mind.
9 Starting of motor-operated appliances	Not applicable.	IEC 60335-2-7	9	Identical with JIS .	IDT	—	
10 Power input and current	Marked value of rated power input or rated current, tolerances for measured value thereon, and measurement procedures	IEC 60335-2-7	10	Identical with JIS .	IDT	—	
11 Heating	Installation conditions, test duration and points of temperature measurement are specified.	IEC 60335-2-7	11	Identical with JIS .	IDT	—	

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Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
12 Void	No specification	IEC 60335-2-7	12	Identical with JIS .	IDT	—	
13 Leakage current and electric strength at operating temperature	Leakage current test and electric strength test under operating conditions	IEC 60335-2-7	13	Identical with JIS .	IDT	—	
14 Transient overvoltages	Alternative test by means of impulse for each clearance not satisfying the specified value	IEC 60335-2-7	14	Identical with JIS .	IDT	—	
15 Moisture resistance	IP test, water spillage test and moisture resistance test	IEC 60335-2-7	15	Identical with JIS . However, the amount of detergent used for water spillage test is specified to be 5 g/L only.	MOD/ addition	JIS made such modification that the amount of detergent, if stated in the instruction, is used.	In Japan, detergent normally used differs from that specified in annex AA in kind, because quality, temperature and amount of water differ from the assumption of IEC . Therefore, the amount described in the instruction is added in JIS (IEC also accepts the use of detergents other than that specified in annex AA).

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
16 Leakage current and electric strength	Evaluation of insulation after moisture resistance test	IEC 60335-2-7	16	Identical with JIS .	IDT	—	
17 Overload protection of transformers and associated circuits	Temperature test in which overload or short-circuit of transformer is simulated.	IEC 60335-2-7	17	Identical with JIS .	IDT	—	
18 Endurance	Not applicable	IEC 60335-2-7	18	Identical with JIS .	IDT	—	
19 Abnormal operation	Limiting of heat dissipation, locking of motor, failure of electronic components, failure of program, etc.	IEC 60335-2-7	19	Identical with JIS .	IDT	—	
20 Stability and mechanical hazards	Stability, interlocks and protection of movable parts of power-driven wringers	IEC 60335-2-7	20	Identical with JIS .	IDT	—	
21 Mechanical strength	Impact hammer test	IEC 60335-2-7	21	Identical with JIS .	IDT	—	

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Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
22 Construction	Construction in general, hydraulic pressure test, etc.	IEC 60335-2-7	22	Identical with JIS.	IDT	—	
23 Internal wiring	Flexure of internal wiring, electric strength, internal wiring in hose, etc.	IEC 60335-2-7	23	Identical with JIS.	IDT	—	
24 Components	Non-self-resetting type is required for thermal cut-outs	IEC 60335-2-7	24	Identical with JIS.	IDT	—	
25 Supply connection and external flexible cords	Types, sectional area, etc. of supply cords	IEC 60335-2-7	25	Identical with JIS.	IDT	—	
26 Terminals for external conductors	Prevention of loosening of terminal screws, sizes of terminal screws, etc.	IEC 60335-2-7	26	Identical with JIS.	IDT	—	
27 Provision for earthing	Prevention of loosening and resistance to corrosion of earth wire, earth circuit test, etc.	IEC 60335-2-7	27	Identical with JIS.	IDT	—	
28 Screws and connections	Endurance, types, prevention of loosening, etc. of screws	IEC 60335-2-7	28	Identical with JIS.	IDT	—	

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
29 Clearances, creepage distances and solid insulation	Clearances, creepage distances and thickness of solid insulation Pollution degree 3 and a CTI not less than 250 are required.	IEC 60335-2-7	29	Identical with JIS .	IDT	—	
30 Resistance to heat and fire	Ball pressure test, glow-wire test and needle-flame test	IEC 60335-2-7	30	Identical with JIS .	IDT	—	
31 Resistance to rusting	Protective means against rusting	IEC 60335-2-7	31	Identical with JIS .	IDT	—	
32 Radiation, toxicity and similar hazards	No especial requirement	IEC 60335-2-7	32	Identical with JIS .	IDT	—	
Annexes	As specified in JIS C 9335-1 .	IEC 60335-2-7	Annexes	Identical with JIS .	IDT	—	
Annex AA	Detergent and rinsing agent	IEC 60335-2-7	Annex AA	Identical with JIS .	IDT	—	There is no technical difference, however such caution that JIS also does not endorse particular product is added.
Annex BB	Ageing test for elastomeric parts	IEC 60335-2-7	Annex BB	Identical with JIS .	IDT	—	
Designated degree of correspondence between JIS and International Standard: MOD							

Remarks 1 Symbols in sub-columns of classification by clause in the comparison table indicate as follows:

— IDT: Identical in technical contents.

— MOD/addition: Adds specification item(s) or content(s) not included in International Standard.

2 Symbol in column of designated degree of correspondence between **JIS** and International Standard in the comparison table indicates as follows:

— MOD: Modifies International Standard.

Reference standards

The reference standards in **JIS C 9335-1** are applicable except as follows.

Addition:

IEC 60436 *Methods for measuring the performance of electric dishwashers*

IEC 60456 *Clothes washing machines for household use—Methods for measuring the performance*

ISO 3964 *Safety of colours and safety signs*

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